

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : Confirmation No. 2194  
Kotaro Kobayashi et al. : Attorney Docket No. MI/242  
Serial No. 10/575,344 : Group Art Unit 2831  
Filed March 20, 2007 : Examiner David M. Sinclair

Electrode For Electric Double Layer  
Capacitor, Method For Manufacturing of  
the Same, Electric Double Layer Capacitor  
and Conductive Adhesive:

**DECLARATION UNDER 37 CFR 1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Shin-ichi TACHIZONO a citizen of Narita-shi, Chiba, Japan, declare as follows:

1. I am one of the inventors of the above-identified application.
2. I graduated from Hiroshima University, majoring chemical engineering in the year 1987.
3. I have worked in Hitachi Powdered Metal Co., Ltd. for 20 years in total in Research & Development section.
4. I have studied the above-identified application, Serial No. 10/575,344, the Office Action therein dated March 11, 2008, and the references relied upon by the Examiner in rejecting the claims.

5. In order to support the patentability of the presently claimed invention, I present the attached Test Report. The experiments set forth therein were conducted by me or under my supervision and control.

#### Test Report

##### Production of Samples

##### 1) Collector

High-purity etched aluminum foil (C513, manufactured by KDK) having a width of 150 mm and a thickness of 50  $\mu\text{m}$  was used.

##### 2) Conductive Adhesive

The platelet-like graphite (natural scale-like graphite) with an ash content of 0.02% and an average particle diameter of 4  $\mu\text{m}$  and the carbon black (acetylene black) with an ash content of 0.02% and an average particle diameter (primary particle diameter) of 35 nm (Denka Black, manufactured by Denki Kagaku Kogyo) were used as carbon materials. In addition, SBR latex (grade 0850, manufactured by JSR) was used as the synthetic rubber. These materials were mixed as indicated by the compositions shown in Table 1 and Table 2 to obtain a conductive adhesive.

Table 1: weight ratio of carbon material to SBR

	carbon materials (carbon black and graphite)	SBR
Sample 1	97 mass%	3 mass%
Sample 2	97 mass%	3 mass%
Sample 3	97 mass%	3 mass%
Sample 4	97 mass%	3 mass%
Sample 5	97 mass%	3 mass%

Table 2: weight ratio of carbon black to platelet-like graphite

	carbon black	platelet-like graphite
Sample 1	100 mass%	0 mass%
Sample 2	50 mass%	50 mass%
Sample 3	33 mass%	67 mass%
Sample 4	25 mass%	75 mass%
Sample 5	0 mass%	100 mass%

### 3) Test Sample

One side surface of the collector was coated with the conductive adhesive using an application roll. The coating amount was  $30 \text{ g/m}^2$  (amount after drying:  $7 \text{ g/m}^2$ ). This coated collector was then passed through the interior of a continuous hot air dryer set to a temperature of  $150^\circ\text{C}$  for a period of 3 min, thereby removing the dispersion medium from the conductive adhesive and producing a Test Sample.

### Volume resistivity

Volume resistivity of the conductive adhesive layer of the Test Piece was determined by four-terminal method using LCR meter (10mA of impressed alternating current of 287Hz).

Volume resistivity of the each Test Sample is as follows.

	volume resistivity ( $\Omega\cdot\text{cm}$ )
Sample 1	0.4
Sample 2	0.084
Sample 3	0.07
Sample 4	0.074
Sample 5	0.24

The internal resistance of the electrode consists of (1) the ion diffusing resistance, (2) the electrolytic resistance, (3) the contact resistance of the porous sheet, and (4) the internal contact resistance between the porous sheet and the collector. Volume resistivity measured above corresponds to (4) the internal contact resistance between the porous sheet and the collector. Therefore, lowering the volume resistivity contributes to the lowering the internal resistance.

6. I further declare that all statements made herein of my own knowledge are true, and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: Aug. 23. 08

Shinichi Tachizono  
Shin-ichi TACHIZONO